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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/724,615	12/02/2003	Yoshihiko Imanaka	032152	2602
38834 7590 05/16/2007 WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP 1250 CONNECTICUT AVENUE, NW SUITE 700 WASHINGTON, DC 20036			EXAMINER KEMMERLE III, RUSSELL J	
			ART UNIT 1731	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

**Application No.**

10/724,615

**Applicant(s)**

IMANAKA ET AL.

**Examiner**

Russell J. Kemmerle

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 19 March 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 21-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 21-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

All objections to the drawings, specification and claims as well as all rejections to the claims under 35 USC §112 are withdrawn in light of applicant's amendment received 19 March 2007.

#### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 21, 22, 25-27 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otsuki ('875) in view of Miyazaki ('617).

Referring to claim 21, Otsuki ('875) discloses creating a substrate by forming several layers, each layer containing conducting and insulating regions, the layers being formed sequentially on top of one another (see Claims 1-5). Specifically, Otsuki discloses forming multiple regions on an individual layer of different materials, then forming directly on top of that layer, a second layer comprised of multiple regions and multiple materials, which is continued with layers being built directly on top of each other (see pages 3-4, paragraphs 0095-0134).

Otsuki ('875) does not disclose the method of forming the layers by screen printing each of the conducting and insulating regions.

Miyazaki ('617) discloses screen printing a layer of conductive material over a base layer (page 4, paragraph 0061) and then screen printing a ceramic layer on the base layer in the areas in which the conductive material was not printed, thus forming a layer having both a conductive material region and a ceramic material region (page 4,

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paragraph 0062). Miyazaki ('617) goes on to disclose releasing the created layer from the support it was printed on (page 4, paragraph 0064) and firing the layer (page 4, paragraph 0065).

It would have been obvious to one of ordinary skill in the art, at the time of invention by applicant, to modify the method taught by Otsuki ('875) by depositing the material by screen printing as taught by Miyazaki ('617) since Otsuki ('875) discloses the method of forming the substrate by depositing layers of conducting and insulating regions on top of the previous layer, and Miyazaki ('617) discloses that screen printing is an effective means for depositing regions of conducting and insulating materials.

Referring to claim 22, Otsuki ('875) is relied upon as discussed above. Otsuki ('875) further teaches forming electronic components (such as a capacitor, resistor, diode, transistor, etc.) in one or more of the layers of the substrate by depositing a material with the desired characteristics on one of the layers (see Claims 14-18). Otsuki ('875) discloses creating several different types of electronic components (e.g., capacitor, resistor, diode, transistor, etc.), which would necessarily have different dielectric constants.

Referring to claim 25 Otsuki ('875) is relied upon as discussed above. Otsuki ('875) further teaches forming a conductive section inside an insulative layer to electrically connect conductive sections above and below the insulative layer (i.e., a via) (page 12, paragraph 0286).

Referring to claim 26, Otsuki ('875) is relied upon as discussed above. Otsuki ('875) further discloses that the via is formed by depositing a post on top of a conductive

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section to electrically connect the lower conductive layer to an upper conductive layer (page 12, paragraph 0286).

Referring to claim 27, Miyazaki ('617) further discloses that conductive paste can be screen printed on to a base layer, in order to form a conductive layer (page 1, paragraph 7).

Referring to claim 29, Otsuki ('875) is relied upon as discussed above, particularly in the rejection of Claim 3 above. Otsuki ('875) discloses creating a capacitor in the substrate (page 13, paragraph 0294) and other electronic components (such as a resistor, diode, or transistor) (Claims 14-18).

Referring to claim 30, Otsuki ('875) is relied upon as discussed above. Otsuki ('875) further discloses placing a second layer of an insulative material over the conductive layer to bury it (see Fig 23, showing conductive layers, 410 and 412, completely covered by an insulative layer, unnumbered).

Referring to claim 31, Otsuki ('875) is relied upon as discussed above. Otsuki ('875) further discloses a first and third layer made of a conductive material, and a second layer made out of an insulator to form a capacitor (i.e., a passive element) (page 13 paragraph 0294).

Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otsuki ('875) and Miyazaki ('617) in view of Ushikoshi ('606).

Referring to claim 23, Otsuki ('875) and Miyazaki ('617) are relied upon as discussed above in the rejection of claim 21.

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Otsuki ('875) and Miyazaki ('617) fail to disclose using a material to act as a stress mitigating region between two other regions.

Ushikoshi ('606) discloses placing a protective or stress mitigating layer between different materials to reduce the likelihood of cracks or other problems in the laminated piece (Col 9, lines 1-5).

It would have been obvious to one of ordinary skill in the art, at the time of invention by applicant, to modify the method taught Otsuki ('875) and Miyazaki ('617) of screen printing a layer containing both an insulative and conductive region by adding a third stress mitigating region as taught by Ushikoshi ('606) since Otsuki ('875) and Miyazaki ('617) place no limit on the number of regions which could be screen printed on one layer, and Ushikoshi ('606) discloses the desirability of a stress mitigating layer to help reduce cracking and other problems in a laminated piece.

Referring to claim 24, Otsuki ('875) and Miyazaki ('617) are relied upon as discussed above in the rejection of Claim 21.

Otsuki ('875) and Miyazaki ('617) fails to disclose using a material with a composition which has at least one component from the first dielectric material and at least one component from the second dielectric material as a stress mitigating region for the two proximate regions.

Ushikoshi ('606) discloses using Molybdenum Carbide as a stress mitigating region between regions of Molybdenum metal and Molybdenum Oxide (the Molybdenum having at least one component from the material on each side of it, in both cases Molybdenum) (Col 8 lines 29-36)..

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It would have been obvious to one of ordinary skill in the art, at the time of invention by applicant, to modify the method taught Miyazaki ('617) of screen printing a layer containing both an insulative and conductive region by adding a third stress mitigating region as taught by Ushikoshi ('606) since Miyazaki ('617) places no limit on the number of regions which could be screen printed on one layer, and Ushikoshi ('606) discloses the desirability of a stress mitigating layer to help reduce cracking and other problems in a laminated piece. It would have been further obvious to one of ordinary skill in the art, at the time of invention by applicant, to have created the stress mitigating region using a material with a composition middle between the two proximate materials since Ushikoshi ('606) discloses using Molybdenum Carbide as a stress mitigating region between regions of Molybdenum metal and Molybdenum Oxide.

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Otsuki ('875) and Miyazaki ('617) in view of Yamana ('374).

Otsuki ('875) and Miyazaki ('617) are relied upon as discussed above in the rejection of Claim 27.

Otsuki ('875) and Miyazaki ('617) do not disclose, after screen printing a conductor layer on the base layer, pressurizing the basic layer and conductor layer to planarize the basic layer and conductor layer.

Yamana ('374) discloses coating an electrode paste on to a ceramic green sheet, and then subjecting the combined layer to a pressure in order to smooth it (page 6, paragraph 0093, Claim 1).

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It would have been obvious to one of ordinary skill in the art, at the time of invention by the applicant, to modify the method of screen printing a conductive layer on to a base layer as taught by Otsuki ('875) and Miyazaki ('617) by adding the step of applying pressure to the combined layer to smooth the surface as disclosed by Yamana ('374), since Yamana ('374) discloses that adding the step of pressurizing the layer helps reduce cracking and delamination in the final piece.

### ***Response to Arguments***

Applicant's arguments filed on 19 March 2007 have been fully considered but they are not persuasive.

Applicant argues that Miyazaki does not disclose forming successive layer on top of each other, but instead teaches forming individual green sheets, which are then laminated together to form the final product. While this is true, Otsuki does disclose depositing successive layers on top of each other by discharging drops of a solvent containing a fine material to cover that area, where layers are built directly on top of each other. As discussed above in the rejection of claim 21, it would have been obvious to one of ordinary skill in the art to modify Otsuki by using the screen printing method taught by Miyazaki since both result in finely controlled regions of a selected material, and individual layers being made up of multiple materials.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP



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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Russell J. Kemmerle whose telephone number is 571-272-6509. The examiner can normally be reached on Monday through Friday, 8:30-4:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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